Amendment to the Claims:

1. (Currently amended) A method of compensating for channel inversions comprising:

determining ~~the~~ a sign of a frame;

differentially encoding the sign of the frame;

differentially encoding the frame;

transmitting a channel output comprising the differentially encoded sign and frame;

receiving the channel output;

determining ~~the~~ a sign of the output; and

differentially decoding the output.

B1

2. (Currently amended) The method of Claim 1, wherein the sign of the frame is set to zero if $R_0 <= N/2$ and the sign of the frame is set to one if $R_0 > N/2$, where R_0 is a value of the frame ~~value~~ and N is ~~the~~ a product of ~~the~~ a plurality of moduli used to form the channel output.

3. (Currently amended) The method of Claim 1, wherein the sign of the frame is set to zero if $R_0 < N/2$ and the sign of the frame is set to one if $R_0 => N/2$, where R_0 is a value of the frame ~~value~~ and N is ~~the~~ a product of ~~the~~ a plurality of moduli used to form the channel output.

4. (Currently amended) The method of Claim 1, wherein the sign of the frame is differentially encoded using the equation:

$$d(n) = [s(n) + d(n-1)]_{\mathrm{mod}\,2}.$$

5. (Currently amended) The method of Claim 1, wherein the value of the frame ~~value~~ is differentially encoded using the equation:

$$D(n) = [D(n-1) + N + (-1)^{d(n-1)} R_0]_{\mathrm{mod}\,N}.$$

McDonnell Boehnen Hulbert & Berghoff
300 South Wacker Drive
Chicago, Illinois 60606
Telephone (312) 913-0001

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6. (Previously presented) The method of Claim 1, wherein the output is differentially decoded using the equation:

$$R_0 = [N + (-1)^{r(n-1)} R(n)]_{\text{mod } N}.$$

7. (Previously presented) The method of Claim 1, further comprising translating the differentially encoded frame into symbols.

8. (Currently amended) The method of Claim 1, wherein the sign of the frame and the value of the frame ~~value~~ are differentially decoded.

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9. (Previously presented) A method of compensating for a phase shift in a modem comprising:

attributing a sign to a frame of constellation points;

differentially encoding the frame and the sign; and

differentially decoding the frame and the sign.

10. (Currently amended)The method of Claim 9, wherein the sign of the frame is set to zero if $R_0 <= N/2$ and the sign of the frame is set to one if $R_0 > N/2$, where R_0 is a value of the frame ~~value~~ and N is ~~the~~ a product of ~~the~~ a plurality of moduli used to form the channel output.

11. (Currently amended) The method of Claim 9, wherein the sign of the frame is set to zero if $R_0 < N/2$ and the sign of the frame is set to one if $R_0 => N/2$, where R_0 is a value of the frame ~~value~~ and N is ~~the~~ a product of ~~the~~ a plurality of moduli used to form the channel output.

12. (Currently amended) The method of Claim 9, wherein the differential decoding is performed after being supplied to a multiple modulus decoder.

13. (Previously presented) The method of Claim 9, the frame is differentially encoded before being supplied to a multiple modulus encoder.

McDonnell Boehnen Hulbert & Berghoff
300 South Wacker Drive
Chicago, Illinois 60606
Telephone (312) 913-0001

MBHB: 01-966
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14. (Cancelled)

15. (Currently amended) The method of Claim 1, wherein the differential decoding is performed after being supplied to a multiple modulus decoder.

16. (Currently amended) The method of Claim 1, the frame is differentially encoded before being supplied to a multiple modulus encoder.

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (New) A method of using differential encoding for a communication, the method comprising:

determining a sign of a frame:

differentially encoding the sign of the frame;

applying the differentially encoded sign to the frame so as to produce a first encoded frame;

differentially encoding the first encoded frame so as to produce a second encoded frame; and

transmitting a channel output comprising the second encoded frame.

21. (New) The method of Claim 20, wherein the sign of the frame is set to zero if $R_0 <= N/2$ and the sign of the frame is set to one if $R_0 > N/2$, where R_0 is a value of the frame and N is a product of a plurality of moduli used for transmitting the channel output.

McDonnell Boehnen Hulbert & Berghoff
300 South Wacker Drive
Chicago, Illinois 60606
Telephone (312) 913-0001

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22. (New) The method of Claim 20, wherein the sign of the frame is set to zero if $R_0 < N/2$ and the sign of the frame is set to one if $R_0 => N/2$, where R_0 is a value of the frame and N is a product of a plurality of moduli used for transmitting the channel output.

23. (New) The method of Claim 20, wherein the sign of the frame is differentially encoded using the equation:

$$d(n) = [s(n) + d(n-1)]_{\text{mod } 2}.$$

B1 cont

24. (New) The method of Claim 20, wherein the value of the frame is differentially encoded using the equation:

$$D(n) = [D(n-1) + N + (-1)^{d(n-1)} R_0]_{\text{mod } N}.$$

25. (New) The method of Claim 20, wherein the output is differentially decoded using the equation:

$$R_0 = [N + (-1)^{r(n-1)} R(n)]_{\text{mod } N}.$$

26. (New) The method of Claim 20, further comprising translating the differentially encoded frame into symbols using a plurality of moduli.

27. (New) A method of using differential encoding for a communication, the method comprising:

receiving a channel output comprising a first encoded frame, wherein the first encoded frame comprises a differentially encoded second-encoded frame, and wherein the second-encoded frame comprises a differentially encoded sign of a frame applied to such frame;

differentially decoding a sign of the channel output; and

differentially decoding the channel output so as to obtain the frame, wherein the differentially decoded sign of the frame and frame provide the frame with the proper sign.

McDonnell Boehnen Hulbert & Berghoff
300 South Wacker Drive
Chicago, Illinois 60606
Telephone (312) 913-0001

28. (New) The method of Claim 27, wherein the sign of the frame is set to zero if $R_0 <= N/2$ and the sign of the frame is set to one if $R_0 > N/2$, where R_0 is a value of the frame and N is the a product of a plurality of moduli used for generation of the channel output.

29. (New) The method of Claim 27, wherein the sign of the frame is set to zero if $R_0 < N/2$ and the sign of the frame is set to one if $R_0 => N/2$, where R_0 is a value of the frame and N is a product of a plurality of moduli used for generation of the channel output.

30. (New) The method of Claim 27, wherein the sign of the frame is differentially encoded using the equation:

$$d(n) = [s(n) + d(n-1)]_{\text{mod } 2}.$$

31. (New) The method of Claim 27, wherein the value of the frame is differentially encoded using the equation:

$$D(n) = [D(n-1) + N + (-1)^{d(n-1)} R_0]_{\text{mod } N}.$$

32. (New) The method of Claim 27, wherein the output is differentially decoded using the equation:

$$R_0 = [N + (-1)^{r(n-1)} R(n)]_{\text{mod } N}.$$

33. (New) The method of Claim 27, further comprising translating the differentially encoded frame into symbols.

McDonnell Boehnen Hulbert & Berghoff
300 South Wacker Drive
Chicago, Illinois 60606
Telephone (312) 913-0001